

22 April 1955

## MEMORANDUM FOR THE RECORD

SUBJECT : Synthesis of Attributable Speech

REFERENCE : Employee Suggestion No. 1282 of [ ]  
[ ]STAT  
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1. [ ] suggestion is for the synthesis of speech which would be attributed to any desired person. It involves getting adequate samples of the person's speech and from them constructing the desired speech. The treatments involved in this process, which might include some outright fabrication, would be carried out by drawing by hand enlarged variable-area sound tracks, which would subsequently be reduced photographically.

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2. Recently I discussed [ ] suggestion with the man at Bell Telephone Laboratories who is best qualified, from experience in the subject and standing in the organization, to give an opinion. He stated positively that nothing could be achieved by working with variable-area sound tracks. This is because the appearance of the sound track is greatly dependent upon the relative phase of its component harmonics. The ear, however, cannot recognize these phase differences. Consequently, a given sound can be produced by a wide variety of sound tracks varying greatly in appearance. In other words, the appearance of a sound track does not give that basic information on the sound represented which is necessary for the desired synthesis.

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3. My consultant went on to say that it would be necessary to do the sort of analysis which is done by a Vocoder. If the analysis were done by a Vocoder having 30 channels within the band of speech frequencies up to, say, 4000 cycles per second, then it would be possible to put the speech together again without detection. This is the sort of analysis which, in his opinion, would be the necessary prerequisite for the desired synthesis.

4. I asked my consultant if he could give any estimate about the size of such a job. He replied that he could only say that it would be a big job. The way in which he emphasized big indicated to me an expense measured

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in hundreds of thousands of dollars. There was no discussion of the time involved, but large expense inevitably involves long time.

5. The various papers on the Vocoder reprints of which were given to me were all published in 1940 or earlier. This was the period of greatest activity in this work. Since the war there has been a definite change in the emphasis on acoustics at Bell Telephone Laboratories, and it is my impression that work of this sort is considered to have passed into the region of diminishing returns and is being carried on much less actively. I expect to look into this matter during my next visit to the Laboratories.

[redacted]  
TSS/Technical Advisory Group

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TSS/OC: [redacted] (22 April 1955)

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